



# Scoil San Eoin

## Whole School Plan for

### Science



## **Introductory Statement**

This Science policy was devised through the collaboration of staff from Scoil San Eoin. The plan was discussed and revised before being put before the Board of Management for ratification. As a whole school plan it will inform teaching and learning of this subject and will serve as the basis for all long and short term planning on Visual Arts.

## **Rationale**

- The purpose of this policy in Science is to compile a user –friendly document outlining the approach, methodologies, timetable, content and resources necessary to implement the subject as per Curriculum.
- It is hoped that this plan will ensure that children will experience a broad and balanced curriculum in which undue repetition and significant gaps are avoided.
- It is intended that over a two-year period all strand units from each strand should be covered.
- There should also be a balance between the development of scientific knowledge and understanding and the processes of working scientifically.
- This policy should ensure continuity and progression in the development of scientific ideas and in the application of investigative skills.

## **Vision and Aims**

### **Vision**

Science in the school should help children to develop a broad range of skills of enquiry, cultivate important attitudes and encourage the acquisition of scientific knowledge and concepts about the biological and physical world. We aspire to help pupils reflect critically to make sense of their experiences.

We promote learning activities that foster the pupil's curiosity and enjoyment so that they will develop a lasting interest in science. Practical activities, focusing on the scientific process are included as an important part of Science lessons.

### **Aims**

- To develop knowledge and understanding of scientific and technological concepts through the exploration of human, natural and physical aspects of the environment
- To develop a scientific approach to problem-solving which emphasises understanding and constructive thinking
- To encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities
- To foster the child's natural curiosity, so encouraging independent enquiry
- To aid the child to appreciate the contribution of science and technology to the wider world
- To appreciate and respect diverse living and non-living things
- To encourage the child to become environmentally responsible and aware
- To enable the child to communicate ideas, present ideas and report findings using a variety of media
- To encourage the child to behave responsibly to protect, improve and cherish the environment and to become involved in the identification, discussion, resolution and avoidance of environmental problems and so promote sustainable development
- Support the schools effort to gain the Green Flag Award as part of whole school action for the environment and raising pupil awareness of the importance of environmental issues.

## Curriculum Planning

The Science Curriculum comprises of two parts:

- Skills development
- Strand and strand units

### Skills development:

*\*See Appendix 1 for complete Curriculum Content at each class level.*

### Skills development: Junior – Second Classes

<b>Working scientifically</b>	<ul style="list-style-type: none"><li>• Questioning</li><li>• Observing</li><li>• Predicting</li><li>• Investigating and experimenting</li><li>• Estimating and measuring</li><li>• Analysing</li><li>• Sorting and classifying</li><li>• Recording and communicating</li></ul>
<b>Designing and making</b>	<ul style="list-style-type: none"><li>• Exploring</li><li>• Planning</li><li>• Making</li><li>• Evaluating</li></ul>

**Skills development: Third – Sixth Classes**

Working scientifically	<ul style="list-style-type: none"><li>• Questioning</li><li>• Observing</li><li>• Predicting</li><li>• Investigating and experimenting</li><li>• Estimating and measuring</li><li>• Analysing</li><li>• Sorting and classifying</li><li>• Recognising patterns</li><li>• Interpreting</li><li>• Recording and communicating</li></ul>
Designing and making	<ul style="list-style-type: none"><li>• Questioning</li><li>• Observing</li><li>• Predicting</li><li>• Investigating and experimenting</li><li>• Estimating and measuring</li><li>• Analysing</li><li>• Sorting and classifying</li></ul>

The science skills above will be developed as work is completed on the strands and strand units of the curriculum outlined in Appendix 1 & 2

## Strand and strand units

Strand	Strand units
Living things	Human life Plant and animal life
Energy and forces	Light Sound Heat Magnetism and electricity Forces
Materials	Properties and characteristics of materials Materials and change
Environmental awareness and care	Environmental awareness Science and the environment Caring for the environment

Science Plan Overview	
Year 1 (odd)	Year 2 (even)
<b>Living things:</b> Plants	<b>Living things:</b> Animals
<b>Materials:</b> Materials and change	<b>Materials:</b> Properties and characteristics of materials
<b>Energy and Forces:</b> Light, sound and heat.	<b>Energy and Forces:</b> Magnetism, electricity and forces.
<b>Environment awareness and care:</b> Caring for your environment.	<b>Environment awareness and care:</b> Science and the environment.
<b>Every year</b> <b>Living things:</b> Myself	<b>Living things:</b> Myself

The words odd/even refer to the year in which the school year begins, For example, the school year begins in September 2017. The year number is odd, therefore the programme followed for the whole school year until June 2018 is the odd programme. This timetable will allow all classes to follow similar themes simultaneously.

Our science plan is based on a spiral approach as per the curriculum. For this reason, it is not intended that all strand units will be taught in each class. The units may be supplemented by extension work at the discretion of the class teacher.

#### **Practical Investigations:**

- These will be used as appropriate at each class level.
- The concept of a fair test is introduced from third class with the children encouraged to identify the conditions that make a difference to an experiment.

#### **Balance between Knowledge and Skills**

- The school participates in the Discover Primary Science and Maths Awards. The programme promotes the skills of working scientifically through conducting of open ended investigations.
- It also develops the skills of designing and making in each of the strands.
- At least one open ended investigated and one designing and making activity will be conducted in each of the strands each year.

## **Using the environment**

- The school is committed to making use of its grounds and the habitats of the locality.
- The immediate environment will be the starting point for environmental education
- As their knowledge and understanding grow they will then learn about other environments in the Irish, European and Global context
- In keeping with our Green schools programme children will actively participate in-Litter management, recycling, waste reduction, energy awareness and water conservation



## Approaches and Methodologies

To develop the children's capacity 'thinking scientifically' and to accommodate the different learning styles of the children all teachers will employ a wide range of teaching approaches and methodologies including

- Using the environment
- Active learning
- Guided and discovery learning
- Free exploration of materials
- Spiral nature of the curriculum – opportunities to return to earlier learning and to extend and enhance it
- Learning through language

The approaches adopted should create a learning environment where:

- Practical activity is encouraged (Hands- on discovery)
- Links with the environment are fostered
- Children have an opportunity to work together, share ideas and communicate their findings
- Children's ideas are the starting point for science activities (Concept mapping)
- Children should be allowed the excitement of finding out for themselves
- Children are encouraged to pose their own questions
- Aistear

The nature of the strands and strand units themselves necessitates the use of a variety of teaching methods. The approaches chosen should enable the children to work scientifically in a variety of contexts, to undertake practical activities and to tackle open-ended investigations. Different methods are outlined as follows

**Whole-class work:**

This is effective in introducing a topic and concept-mapping. It is also useful in providing background information that may be required for an activity.

**Small groups:**

This can be in many forms:

- Several groups working on the same activity
- Small groups rotating around different activities
- Small groups working on independent activities

**Individual work:**

This is where children pursue their own studies and carry out investigations that allow them to pursue their own interests and ideas.

**Linkage and Integration**

- Opportunity for the use of an integrated approach exists in all levels in the science curriculum within the school.
- The strands and strand units of the science curriculum are not discrete – work on a topic or investigation may incorporate strands from other curriculum areas.
- Teachers will make provision for this linkage in their short-term planning.

**Children with Different Needs**

This Science programme aims to meet the needs of all the children in the school. This will be achieved by:

- Teachers varying the pace, content and methodologies to insure learning for all pupils. Evidence of this differentiated approach will be recorded in the teachers planning.
- The requirements of children with special needs will be taken into account when planning class lessons and related activities.
- The S.N.A. supports children with particular needs and groups as directed by the class teacher. (when applicable)
- Where a teacher recognises that a child displays a particular ability or interest in Science; this will be communicated to the parents so that the child is encouraged and supported at home also.
- Children of exceptional ability are encouraged to access additional information through the school library, the internet and conducting independent research projects.

### **Equality of Participation and Access**

- We view the Science programme as playing a key role in ensuring equality of opportunity for all children.
- The programme at each class level will be flexible so that the learning requirements of all children may be addressed.
- We provide an equal educational experience for both boys and girls as we recognise that stereotyped expectations of gender roles can inhibit children's educational achievements.
- Children with special needs will be included in all activities.
- No child will be excluded from workshops or fieldtrips due if parents/guardians are unable to cover the cost of the activities. In such instances the school will cover the cost.

## Assessment

Assessment in Science is concerned with the children's mastery of knowledge and understanding of the strands of the science programme and the development of skills and attitudes. Consequently a broad range of assessment tools and approaches will be necessary. The following are among the assessment tools found useful in schools:

### ***Teacher Observation***

Observations made by the teacher during practical science tasks will help to determine the development of process skills and attitudes. They will also help to establish the extent to which the children have mastered the knowledge aspect. The teacher will need to take an active role in science tasks and ask open-ended questions to gain insight into a child's understanding.

### ***Teacher-designed tasks and tests***

Some representational record, whether written, drawn, sculpted or modelled, is necessary to build up a picture of the child's achievements. A wide variety of tasks should be provided for the children, including:

- Observing
- Analysing objects and processes and hypothesising about how systems work or are made
- Predicting outcomes of an investigation
- Collecting information from books and materials
- Asking questions
- Providing oral, written and pictorial accounts of investigations
- Displaying projects
- Using work cards or activity sheets
- Designing, making and evaluating models and structures

### ***Teacher-designed tasks and tests***

- Using interactive multimedia programs to explore themes and complete a range of tasks and problems
- Exploring and engaging in practical investigations in the environment
- Completing teacher-designed tests on a unit(s)
- Displaying and reporting project work
- Drawing with labels (teacher can discuss drawing with child and annotate it as a result of asking questions)

### **Concept-mapping**

The child's initial ideas must be explored if they are to form a starting point for learning. Concept-mapping helps children to record and discuss their ideas (in other words, brain-storming). This will help enormously to see what pre-conceived ideas the children may have. It is also useful as an assessment tool at the end of a unit to see if there has been any progression.

Samples will be included in Appendix 3 of this policy

### **KWL chart**

This will help the children to recognise what they know about a topic prior to starting. The children are encouraged to decide what they would like to know and review what they have learned when the topic is completed.

### **Work samples, portfolios and projects**

A wide range of samples of a child's work is compiled to form a science portfolio. This should document and assess progress over a term or longer. The portfolios should contain samples of work in progress or what the child considers to be "best samples" of finished pieces together with teacher's comments. The samples chosen should demonstrate achievement in a range of areas. Samples of work in one area may be included to show progression of ideas and skills.

Written accounts or drawings, photographs of stages of an investigation, graphs, and samples of worksheets or audio tapes of children's reports of investigations may be enclosed.

### **Curriculum profiles**

These profiles consist of descriptions of the range of knowledge, skills and attitude that might be expected of children at different stages of development. These descriptions may be written in the form of a short paragraph. As teachers observe their pupils, they should seek to highlight or mark the relevant paragraphs as work is in progress or completed.

## Organisational Planning

### **Timetable**

- As per curriculum guidelines, three hours per week are given to the teaching of S.E.S.E. from First to Sixth Class and 2 hours 15 minutes in Junior & Senior Infants.
- This time allocation may be broken down at the discretion of the individual teacher. Teachers can decide to allocate time for Science on a weekly basis or they can block time over each month. This should be indicated in each teacher's timetable.
- We recognise that in the junior classes, the time allotted will be of shorter duration on a more frequent basis, while senior classes may divide the hour into longer time spans.
- There is discretionary time available each week (Infants: one hour, First to Sixth Classes: two hours) that teachers can occasionally use to support the History/Geography curriculum.
- Teachers should ensure that pupils attending supplementary teaching are included for as much of the Science programme as possible.

### **Homework**

- Homework should be in line with the school policy and the primary school curriculum for Science.

### **Individual Teachers' Planning and Reporting**

- Teachers will base their yearly and short term plans on the approaches set out in the whole school plan for Science.
- Each individual teacher will be responsible for their own short and long term planning

## **Individual Teachers' Planning and Reporting**

- Work completed will be recorded using the cuntas miosuil. These documents will be used to aid reviewing and developing the whole school policy and individual teacher preparation for the following years. Any changes staff wish to make to improve the whole school plan for Science will be discussed at staff meetings.

## **Staff Development**

- Teachers will be made aware of any opportunities for further professional development through participation in courses available in education centres or other venues.
- Skills and expertise within the school are shared and developed through input at staff meeting.

## **Parental Involvement**

- Parents are kept informed of developments in the schools science programme through the school newsletter, website and school displays.
- Parents with particular expertise may be invited to address classes.
- Parents are actively involved through the Green School Programme and Garden projects.

## **Community Links**

Scoil San Eoin is at the heart of the community in Redcross. We strive to ensure that all members of the school and wider community are involved in school projects and activities where appropriate.



## Safety

During practical work teachers should be aware of the safety implications of any exploratory or investigative work to be undertaken. Children should be encouraged to observe safety procedures during all tasks. There are many safety issues to consider including:

### *Plants and Animals*

- Disposable gloves will be used when investigating hedgerows. Children should never handle unknown or unfamiliar plants, especially fungi. Gloves will also be worn when handling birds or animals. Hand washing should be encouraged after handling plants and animals.

### *Electricity*

- Children should only use low-voltage battery powered devices. Mains electricity should never be used for electricity and magnetism experiments. If mains-powered equipment is used then it should be connected and operated by the teacher only. Children should be repeatedly warned about the danger of mains electricity.

### *Equipment*

- The use of glass apparatus and sharp-edged tools should be avoided except under the direct supervision of the class teacher. Use plastic where possible. Thermometers should be handled carefully. Non mercury thermometers are in use.

### *Eyes*

- Children should never use lenses, binoculars or other lenses devices to look directly at the sun or other intense source of light. This includes dark glass and plastic.

### *Chemicals*

- When household chemicals are used they will be purchased to meet the requirements of the experiment and any surplus is stored in a safe place. We avoid any chemical containing bleach. These chemicals will not be stored in the science resource boxes.

### *Polythene Bags*

- Children should be warned of the dangers of using these bags as they may cause suffocation.

### *Heat*

- Under no circumstances should the children themselves handle matches or lighters. If using candles during an experiment please ensure that they are securely fastened. Lighted candles should never be moved. Care should be taken to avoid situations where children may be tempted to lean across a lighted candle. Long hair should be tied back and loose sleeves secured.
- Any heating can be done with hot water from a tap or from a kettle held by an adult. Flammable liquids should never be used. Small portable gas burners are relatively safe provided that they can be securely mounted to prevent them from toppling over. If they are used, they should be sited clear of curtains, notice boards and busy areas.

### *Cleanliness and Hygiene*

- Random sniffing and tasting should be discouraged. The teacher should explain that anything the children are asked to smell or taste has been carefully chosen for that activity. The sharing of spoons or other utensils should not be permitted. Hand washing should be encouraged before food activities.

## Resources and Equipment

- Science resources have been purchased over a number of years.
- There is a library of CDs, DVDs and ICT programmes that support the science programme available in each class.
- Requests for additional materials should be made to the principal
- Textbooks and work cards can be used during science lessons to support active investigative work. However, Science lessons should not be work card or textbook based.

### List of resources

- Books: Primary Science, Unlocking Science, Blueprints, Windows on the world, Science Quest, Simply Science, Switch on Science, Energy resource in Ireland.
- Cotton wool, batteries, bulbs, vinegar, salt, bread soda, graduated cylinder, magnifying glasses, vitamin C, torches, gloves, thermometer, mirrors, plastic spoons, test tubes, magnets, cotton wool, straw

## Success Criteria

The success of this plan will be measured using the following criteria:

- Implementation of the Science curriculum will be evident in the teacher's plans
- Continuity of content and methodology will be evident in teacher's preparation and monthly reports
- Ongoing assessment, formal and informal will show that pupils are acquiring understanding of concepts and proficiency in scientific skills appropriate to their age and ability.
- Positive feedback from teachers/pupils/ parents

### **Roles and Responsibilities**

- Class teachers are responsible for following the whole school plan and for the implementation of the science programme in their own class.
- Pupils are expected to co-operate and participate in class lessons.
- The principal is responsible for leading the monitoring and evaluating of the plan

### **Implementation and Review**

This plan will be implemented by all staff of Scoil San Eoin from 2017 and will be reviewed on a bi-annual basis, or whenever it is deemed by staff members that updates are necessary.

### **Ratification and Communication**

This policy was ratified by the Board of Management of Scoil San Eoin on \_\_\_\_\_ . It will be circulated to each teacher. It will then also be made available on the school website.

\_\_\_\_\_  
Henry Fleming

(Chairperson)

Date: \_\_\_\_\_

\_\_\_\_\_  
Linda Greene

(Principal)

Date: \_\_\_\_\_

